

Application No. 10/082,000
Attorney Docket No. W1010.136-US-01 (formerly 134.140)

REMARKS

With this Amendment, claims 1-3 are amended, and claims 4 and 8-12 are canceled, such that claims 1-3 and 5-7 remain pending. Reconsideration and review of the claims as amended is respectfully requested.

With this Amendment, the specification is also amended, such that the heading "Summary of the Invention" is moved to be inserted prior to page 2, line 6, and further, at page 2, line 6 of the application, the words "Laid-Open" are deleted. This was a typographical error in the translation. Please note the Japanese Patent Application No. 240691/2000 referred to was actually Laid-Open on February 22, 2002, with Laid-Open No. 58231/2002; this date is after the priority date of the present application. Accordingly, the Japanese Patent Application No. 240691/2000 cannot be used as prior art.

This means that it was not publicly known to reduce the cogging torque and the tertiary harmonic contents in the current wave form by arranging the pole teeth provided on the tip ends of the magnetic poles with windings at the vernier pitch wherein the permeance distribution is balanced by the six order harmonic contents with respect to the three-phase hybrid type stepping motor having six magnetic poles with windings.

With respect to the Examiner's comments in paragraph 2 of the Office Action dated June 17, 2003, kindly note that on page 5 of Applicant's Amendment and Response submitted February 18, 2003, was the instruction "Please cancel all paragraphs beginning on Page 10, line 20 through Page 13, line 17."

Further, this application has been amended to correct the inconsistencies noted by the Examiner in paragraph 2 of the Office Action.

Claim 3 has been amended according to the Examiner's suggestion in paragraph 3 of the Office Action and further to recite the limitation "a stator tooth pitch is 7.05" in order to clear up the indefiniteness noted by the Examiner in paragraph 4.

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With respect to claim 1, claim 1 is rejected under 35 U.S.C. sec. 103(a) as being unpatentable over Applicant's admitted prior art in view of U.S. Pat. No. 6,160,330 to Sakamoto. As discussed above, the Japanese Patent Application No. 240691/2000 is not prior art with respect to this application. Insofar as Sakamoto alone applies to this application, applicant believes that claim 1 is patentable over Sakamoto. Sakamoto does not disclose or suggest a permeance distribution of the small stator teeth is a vernier pitch balanced by a six order harmonic wave. Further in Sakamoto, the optimum value of the ratio of the tooth width of the small stator teeth with respect to the pitch of the small rotor teeth is .333, which is out of the range of 0.35-0.45 recited in claim 1.

The optimum range recited in claim 1 is obtained by a study of the relation of the effective magnetic flux with respect to the ratio of the tooth width to pitch (as defined), cogging torque, and the rate of distortion of the effective magnetic flux, as obtained by the detailed magnetic finite element analysis. The claimed range is therefore not disclosed or suggested in Sakamoto, and

Claims 2 and 3 are rejected under 35 U.S.C. sec. 103(a) as being unpatentable over Applicant's admitted prior art in view of Harned and further in view of Sakamoto. Insofar as this rejection applies to the claims as amended and in view of the fact that what the Examiner terms is admitted prior art is not prior art, the rejected is respectfully traversed. Amended claims 2 and 3 are patentable over Sakamoto and Harned because neither reference discloses or suggests a permeance distribution of the small stator teeth is a vernier pitch balanced by a six or a three order harmonic wave.

Further, Harned discloses a motor wherein a third harmonic is introduced (see col. 2, line 36), whereas in claim 2 of the present application, a three order harmonic wave is eliminated or balanced.

With respect to claim 3, further note that in Harned, a stator tooth pitch of 7.05 is not disclosed. Kindly note that in Harned a stator tooth pitch is $360/48 = 7.5$.

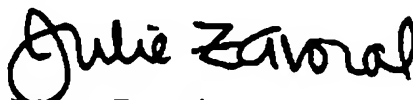
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Claims 5-7 depend respectively from claims 1-3, and are patentable for the reasons stated above.

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the pending claims are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



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I hereby certify that this document is being transmitted via facsimile to Examiner Hanh N. Nguyen, U.S. Patent and Trademark Office, 703/305-3431 ("After Final communication"), on August 25, 2003.


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